

## **CHEMICAL SWITCHING OF NUCLEIC ACID CIRCUIT ELEMENTS**

### Abstract of the Invention

Organic circuit elements and organic conductors are disclosed, together with electron acceptors and donors that may be chemically modified to alter the conductivity of the circuit or organic conductor. An organic circuit element includes a plurality of members, each of which includes an oligonucleotide duplex. The plurality of members includes at least one donor member for receiving conduction electrons from an electron donor, at least one acceptor member for communicating with an electron acceptor to provide a region of attraction for the conduction electrons, and at least one regulator member intersecting with at least one of the plurality of members to define at least one electric field regulation junction, for cooperating with an electric field regulator to regulate an electric field at the junction. A method of regulating an electronic signal between first and second locations in a conductive nucleic acid material includes chemically modifying an electron acceptor or an electron donor that is coupled to the conductive nucleic acid material.